What is claimed is:

1. A method for refining carbon non-saturated molten iron, comprising the steps of:

charging molten iron separated from slag into a molten iron refining container;

carrying out a desulfurizing treatment by supplying a desulfurizing agent to the molten iron in the molten iron refining container and agitating the molten iron;

heating the molten iron before or after the desulfurizing treatment; and

decarburizing the desulfurized molten iron in a decarburizing furnace.

2. The method of claim 1, wherein the heating of the molten iron is carried out before the desulfurizing treatment.

3. The method of claim 1, wherein the heating of the molten iron is carried out after the desulfurizing treatment.

4. The method of claim 1, wherein the step of heating the molten iron comprises heating and carburizing the molten iron.

5. The method of claim 1, wherein the step of heating the molten iron comprises heating the molten iron by an arc heating while gas bubbling by blowing an inert gas into the molten iron.

6. The method of claim 4, wherein the step of heating and carburizing the molten iron comprises blowing the inert gas into the molten iron to effect bubbling in the molten iron, blowing oxygen onto the bath of the molten iron so as to heat the molten iron, and injecting the carbonaceous material into the molten iron to provide the carburization.

7. The method of claim 4, wherein the step of heating and carburizing the molten iron comprises blowing the inert gas into the molten iron to effect bubbling in the molten iron, blowing oxygen into the bath of the molten iron so as to heat the molten iron, and injecting the carbonaceous material into the molten iron to provide the carburization.

8. The method of claim 1, wherein the step of carrying out the desulfurizing treatment comprises supplying a desulfurizing agent and a de-oxidizing agent to the molten iron and agitating the same.

9. A method for refining carbon non-saturated molten iron, comprising the steps of:

charging molten iron separated from slag into a molten iron refining container;

carrying out a desulfurizing treatment by supplying a desulfurizing agent to the molten iron in the molten iron refining container and agitating the molten iron;

carburizing the molten iron before or after the desulfurizing treatment; and

decarburizing the desulfurized molten iron in a decarburizing furnace.

10. The method of claim 9, wherein the carburizing of the molten iron is carried out before the desulfurizing treatment.

11. The method of claim 9, wherein the carburizing of the molten iron is carried out after the desulfurizing treatment.

12. The method of claim 9, wherein the step of carburizing the molten iron comprises heating and carburizing the molten iron.

13. The method of claim 12, wherein the step of heating and carburizing the molten iron comprises blowing the inert gas into the molten iron to effect bubbling in the molten iron, blowing oxygen to the bath of the molten iron so as to heat the molten iron, and injecting the carbonaceous material into the molten iron to provide the carburization.

14. The method of claim 12, wherein the step of heating and carburizing the molten iron comprises blowing the inert gas into the molten iron to effect bubbling in the molten iron, blowing oxygen into the bath of the molten iron so as to heat the molten iron, and injecting the carbonaceous material into the molten iron to provide the carburization.

15. The method of claim 9, wherein the desulfurizing step comprises supplying a desulfurizing agent and a deoxidizing agent and agitating the molten iron.

16. A method for refining a carbon non-saturated molten iron comprising the steps of:

carrying out a desulfurization treatment in at least a one first reacting container of converter type; and

carrying out a decarburization treatment in a second reacting container of converter type.

17. The method of claim 16, wherein a desulfurization treatment comprises adding the desulfurizing agent and blowing an agitating gas of 0.05 Nm^3/min or more per ton of the molten iron.

18. The method of claim 16, wherein the desulfurization treatment comprises adding a desulfurizing agent to the molten iron and feeding oxygen of 2.5 Nm^3/min or less per ton of the molten iron.

19. The method of claim 16, wherein the desulfurization treatment comprises supplying the desulfurizing agent and a carbonaceous material to the molten iron.

20. The method of claim 19, wherein the desulfurizing agent is blown from an agitating gas blowing nozzle.

21. The method of claim 19, wherein the carbonaceous agent is blown from an agitating gas blowing nozzle.

22. The method of claim 16, wherein the molten iron is charged into the molten iron refining container together with a solid iron source, oxygen and the carbonaceous material are supplied, and after the solid iron source is dissolved, the desulfurization is performed.

23. The method of claim 16, wherein steel making slag or a blast furnace making slag is used as the desulfurizing agent for carrying out the desulfurization.

24. A smelting reduction method, comprising the steps of:

(a) charging carbonaceous material and ores into a reacting furnace having a function of directly contacting the carbonaceous material and the ores;

(b) reducing the ores until at least one part of the ores is metallized, the ores containing at least one part of metallized metal being produced;

(c) charging the carbonaceous material from the reducing step (b) and the ores containing at least one part of metallized metal into a smelting furnace of metal bath type; and

(d) blowing a gas containing oxygen 20% or more into the smelting furnace of metal bath to produce molten iron.

25. The method of claim 24, further comprising the step of charging carbonaceous material and pre-reduced ores into the smelting furnace of metal bath type.

26. The method of claim 24, wherein the carbonaceous material to be charged into the reacting furnace has stoichiometrically an amount sufficient for reducing and metallizing all amount of the ores charged in the reacting furnace.

27. The method of claim 24, wherein the reacting furnace is a rotary kiln type or rotary hearth type.

28. A smelting reduction method, comprising the steps of:

(a) charging carbonaceous material and ores into a reacting furnace having a function of directly contacting the carbonaceous material and the ores;

(b) partially reducing the ores in the reacting furnace, and de-volatilizing a volatile content of the carbonaceous material until less than 20%,

(c) charging the de-volatilized carbonaceous material from the step (b) and partially reduced ores into the smelting furnace of metal bath type; and

(d) blowing a gas containing oxygen 20% or more into the smelting furnace of metal bath for producing molten iron.

29. A smelting reduction method, comprising the steps of:

preparing carbonaceous material at least part of which is

de-volatilized;

charging the carbonaceous material and ores into the smelting furnace of metal bath type; and

blowing a gas containing oxygen 20% or more into the smelting furnace of metal bath type to produce molten iron.

30. The method of claim 29, wherein the ore is pre-heated or pre-reduced.

31. A smelting reduction method, comprising the steps of:

charging raw materials containing at least one selected from the group consisting of metallic oxide and metallic hydroxide and flux materials into a smelting reduction furnace;

supplying, as fuels and reducing agents, at least one selected from the group consisting of coal and coke and at least one selected from the group consisting of oil coke and waste plastic into the smelting reduction furnace; and

heating and melting the raw materials and the flux materials by heat burning the fuels and the reducing materials with an oxygen gas.

32. The method of claim 31, further comprising the step of limiting total sulfur amount contained in the fuel, reducing agent, raw materials and flux and brought into the smelting reduction furnace to 20 kg or less per 1 ton of the molten iron produced in the smelting reduction furnace.

33. The method of claim 31, wherein the supplying of the oil coke into the smelting reduction furnace satisfies the following conditions:

(a) the supplying of the oil coke is carried out from the height in 2 m or higher than the surface of the slag bath in the smelting reduction furnace,

(b) the supplying of the oil coke is carried out from the position in the atmosphere where the atmospheric gas is 1000° C or more in the smelting reduction furnace, and

(c) the supplying of the oil coke is carried out by sending out the carrier gas from the supply chute, and with respect to the oil coke (P) to be charged per one chute, the carbonaceous materials (Q), other than the oil coke, to be sent together with the oil coke, the raw materials (R) and the flux (S), the momentum directing downward of all solid substances (P + Q + R + S) is operated to be 100 kgm/s or more.

34. The method of claim 31, wherein the supply of the waste plastic into the smelting reduction furnace satisfies the following conditions:

(a) the supplying of the waste plastic is carried out from the height in 2 m or higher than the surface of the slag bath in the smelting reduction furnace,

(b) the supplying of the waste plastic is carried out from the position in the atmosphere where the atmospheric gas is 1000° C or more in the smelting reduction furnace, and

(c) the supplying of the waste plastic is carried out by

sending out the carrier gas from the supply chute, and with respect to the waste plastic (P) to be charged per one chute, the carbonaceous materials (Q), other than the waste plastic, to be sent together with the waste plastic, the raw materials (R) and the flux (S), the momentum directing downward of all solid substances (P + Q + R + S) is operated to be 100 kgm/s or more.

35. In an iron making method using a blast furnace, a smelting reduction furnace of iron bath type and a sintering machine, an molten iron producing method which is characterized in that sintered ores of large size produced by the sintering machine are supplied into the blast furnace and those of small size are supplied into the smelting reduction furnace of iron bath type.

36. In an iron making method using a blast furnace and a smelting reduction furnace of iron bath type, a molten iron producing method which is characterized in that iron making coke of large size is supplied into the blast furnace and coke of small size is supplied into the smelting reduction furnace of iron bath type.

37. In an iron making method using a blast furnace, a smelting reduction furnace of iron bath type and a sintering machine, a molten iron producing method which is characterized in that sintered ores of large size produced by the sintering machine are supplied into the blast furnace and those of small size are supplied into the smelting reduction furnace of iron bath type, while iron making coke of large size is supplied into the blast

furnace and coke of small size is supplied into the smelting reduction furnace of iron bath type.